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Citation for final published version:

Georgi, M., Schredl, M, Henley, J. and Blagrove, M. 2012. Gender differences in dreaming in childhood and adolescence: the UK Library study. *International Journal of Dream Research* 5 (2) , pp. 125-129. 10.11588/ijodr.2012.2.9433 file

Publishers page: <http://dx.doi.org/10.11588/ijodr.2012.2.9433>
<<http://dx.doi.org/10.11588/ijodr.2012.2.9433>>

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Gender differences in dreaming in childhood and adolescence: The UK Library study

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Summary. This study evaluates gender differences in dream recall frequency, dream sharing frequency, dream listening frequency and nightmare frequency in childhood and adolescence. The sample included 3534 children aged from 6 to 18 who completed a brief questionnaire distributed in libraries. We were able to show that overall girls recalled dreams more often, shared dreams more often, listened more often to dreams and reported higher nightmare frequency than boys. For dream sharing frequency and dream listening frequency gender differences increased significantly with age indicating that gender-specific dream socialization might be probable. As this effect was most prominent for adolescents of 13 years and older, one might speculate that the peer group – especially same-sex friendships play an important role in dream socialization. Dream listening is still a very young field of research and longitudinal studies are necessary to study when gender differences in dreaming emerge and whether these processes effect dream recall frequency and other dream variables in adults.

Keywords: Dream recall, nightmares, dream socialization, gender differences

1. Introduction

Dreaming is defined as mental activity during sleep, whereas the dream report is defined as “the memory of the mental activity during sleep” (Schredl, 2008b, p. 9). Today it is presumed that dreaming is present during the whole sleep (Wittmann & Schredl, 2004). This assumption is based upon the findings of high recall rates from REM awakenings (80%) and NREM awakenings (50%) (Nielsen, 2000). However, the variability in home dream recall is very high (Schredl, 2008a); some persons claim that they never recall dreams whereas others can report a dream almost every morning. Dream recall frequency is affected by state factors and trait factors (Schredl, 2007). One of the most stable findings is that women tend to recall their dreams more often than men (Schredl & Reinhard, 2008). The meta-analysis showed substantial gender differences in all five age groups, although the effect size for children was the smallest (see Table 1). It was suggested that a gender-specific “dream socialization” might explain this finding, i.e., that girls are more likely to be motivated by others (family members, friends) to share dreams or to spend time on dreams than boys (Schredl & Reinhard, 2008). A retrospective study (Bachner, Raffetseder, Walz, & Schredl, 2012) indicated that dream socialization may affect dream recall frequency and attitudes towards dreams in adulthood.

Nightmares are defined as dreams with such strong negative feelings that awaken the dreamer (American Academy of Sleep Medicine, 2005). In a meta-analysis substantial gender differences for nightmare frequency were found in

three of the five age groups (adolescents, young adults, middle-aged adults), while the effect sizes for children and elder adults were not significantly different from zero (see Table 2). Women tend to report more nightmares than men in the age range from about 10 to 60 yrs. (Schredl & Reinhard, 2011).

Levin and Nielsen (2007) cited five possible factors that might explain the gender differences in nightmare frequency: (1) self-report bias; (2) risk factors like childhood sexual abuse, depression, and insomnia; (3) processes that explain the higher depression prevalence in women; (4) coping styles and (5) biological differences in emotional brain processes. The decrease of the gender difference with old age provides an argument against a simple gender-specific self-report bias regarding nightmare frequency (Schredl & Reinhard, 2011). The higher prevalence of risk factors like childhood sexual abuse, depression and insomnia in women is well documented (cf. Schredl & Reinhard, 2011). All these risk factors are correlated with heightened nightmare frequency. Childhood sexual abuse is related to heightened nightmare frequency in adult women (Garfield, 1987), depressive disorders are related to negatively-toned dreams (Schredl & Engelhardt, 2001), and insomnia is also related to heightened nightmare frequency (Schredl, 2009a). The hypothesis that psychosocial risk factors for developing a depression like low instrumentality, ruminative style of coping or emotion-focused coping is related to the occurrence of nightmares have never been tested empirically. Similarly, systematic research studying the effect of brain processes, e.g. amygdala activation patterns, on nightmare frequency still needs to be performed.

The most important factor associated with dream sharing frequency is dream recall frequency: Several studies (Herman & Shows, 1984; Pagel & Vann, 1993; Schredl, 2000; Schredl & Schawinski, 2010) report high correlation coefficients ($r=.40$ to $r=.65$). Therefore, it is not astonishing that dream sharing showed also a considerable gender difference; with women sharing dreams more often than men

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Submitted for publication: September 2012

Accepted for publication: October 2012

Table 1. Effect sizes for different age groups (healthy persons) in dream recall frequency (Schredl & Reinhard, 2008)

Age group	Studies	Sample size	Women/ men	Estimated effect size	Confidence interval (95%)
Children (≤ 10 yrs)	15	4834	2332/2505	0.097	0.035-0.159
Adolescents ($10 < x < 18$ yrs)	18	5725	3133/2592	0.364	0.272-0.456
Young adults ($18 \leq x < 30$ yrs)	81	15781	9238/6543	0.242	0.194-0.289
Middle-aged adults ($30 \leq x < 60$ yrs)	36	16250	9139/7111	0.270	0.206-0.334
Older adults (≥ 60 yrs)	13	1795	1028/767	0.243	0.125-0.362

Note. Effect sizes are significant if the confidence interval does not include zero.

(see Table 3). The effect sizes of $d = .46$ and $d = .60$ reported by studies in children (Keßels, 2004; Schredl & Pallmer, 1998) did not differ from the effect sizes of studies in adults (see Table 3).

Taken these studies together, the findings indicate that stable gender differences were found from the age of ten. The aim of this study is to examine the effect of age (childhood and adolescence) on gender differences regarding dream recall frequency, dream sharing frequency, dream listening frequency and nightmare frequency. We hypothesized that gender differences in dream recall frequency, dream sharing frequency, dream listening frequency and nightmare frequency reflect a gender-specific "dream socialization". In addition, we hypothesized that these gender differences in dream recall frequency, dream sharing frequency, dream listening frequency and nightmare frequency might depend on age because of gender-specific "dream socialization" might have a more pronounced effect on children older than 10 years (more intense peer group interactions).

2. Method

2.1. Participants

The sample included 3534 children (2150 girls, 1384 boys) with the mean age of 11.95 ± 1.85 yrs. The sample sizes for the ages from 6 to 18 are depicted in Table 4. Due to small sample size, the children with ages 6 and 7 were grouped together, as well as the adolescents between 16 and 18 yrs. old.

2.2. Dream questionnaire

The questionnaire entitled "Dream lab: The big library experiment" was devised by the Library Association (United

Kingdom) and Mark Blagrove. The questionnaire covered book preferences, frequency of library visits, and several questions about dreaming. For the present analysis, the following items were included: The first question of the dream section covered dream recall frequency, using a five-point format: "How often do you wake up and are able to remember a dream?" 4 = 4-7 times per week, 3 = 1-3 times per week, 2 = 1-4 times per month, 1 = 1-11 times per year, and 0 = less than 1 time per year, or never. The same scale was given for measuring dream sharing frequency ("How often do you tell some about one of your dreams?"), dream listening frequency ("How often do you listen to someone telling you about one of their dreams?") and nightmare frequency including a brief definition for nightmares: "A nightmare is a vivid dream that is frightening or disturbing, and which you can remember clearly and in detail when you wake up. How often do you have such a nightmare?"

2.3. Procedure

The dream lab questionnaire was distributed in libraries all over the United Kingdom. The text explicitly stated that one does not have to remember dreams, go to a library or read regularly to fill in the questionnaire: this was in order to minimize possible selection effects. The completed questionnaire could be returned to the library or sent to the Library Association anonymously. For the present analysis, questionnaires completed by children from 6 yrs. to 18 yrs. were included. ANOVA and ANCOVA were computed to test gender and age effects as well as their interaction using the SAS 9.2 for Windows software package (SAS Institute Inc., Cary, NC, USA). Due to missing values, sample sizes vary slightly. Degrees of freedom were reported in the following manner: $df = n, m$ with n designates the degrees of freedom of the effect and m the degrees of freedom of the error term.

Table 2. Effect sizes for different age groups (healthy persons) in nightmare frequency (Schredl & Reinhard, 2011)

Age group	Studies	Sample size	Women/men	Estimated effect size	Confidence interval (95%)
Children (≤ 10 yrs)	29	42119	20829/21290	0.031	- 0.008-0.070
Adolescents ($10 < x < 18$ yrs)	20	35333	19269/16064	0.219	0.155-0.282
Young adults ($18 \leq x < 30$ yrs)	42	40162	24221/15941	0.263	0.210-0.317
Middle-aged adults ($30 \leq x < 60$ yrs)	19	61174	33852/27322	0.147	0.099-0.194
Older adults (≥ 60 yrs)	8	8351	5095/3256	0.095	- 0.066-0.257

Note. Effect sizes are significant if the confidence interval does not include zero.

Table 3. Gender differences in dream sharing

Study	Males/females	Mean age	Difference	Effect size
Pagel and Vann (1992)	72/192	37.9 yrs.	f>m	.57
Bartnicki (1997)	46/95	Students	f>m	.62
Schredl and Pallmer (1998)	340/284	12.5 yrs.	f>m	.46
Schredl (2000)	32/55	30.0 yrs.	f>m	.60
Keßels (2004)	53/50	9.7 yrs.	f>m	.60
Szmigielska and Holda (2007)	19/28	Students	f>m	.53
Curci and Rime (2008)	93/48	Students	f>m	.79
Schredl and Schawinski (2010)	68/376	23.5 yrs.	f>m	.73

Positive effect sizes for gender indicate higher incidence among girls than among boys.

3. Results

Averaging the dream recall frequency ratings for the total sample ($n=3478$) showed that on average children between 6 and 18 years remember a dream upon awakening 1-4 times a month to 1-3 times per week (see Table 5). Girls (2.70 ± 1.17 , $n=2128$) tended to recall more dreams than boys (2.47 ± 1.35 , $n=1350$). The effect size for children ≤ 10 years is 0.099 and for children older than 10 years 0.204. The ANOVA indicated a significant gender effect ($F=11.98$, $p=.0005$, $df=1,3477$) and age effect ($F=2.8$, $p=.0016$, $df=9,3477$) but the interaction between gender and age ($F=0.43$, $p=.9186$, $df=9,3477$) was non-significant.

The mean dream sharing frequency ($n=3480$) was about telling dreams 1-11 times per year to 1-4 times a month (see Table 5). Girls (2.05 ± 1.27 , $n=2119$) tell dreams more often than boys (1.39 ± 1.35 , $n=1361$). The ANOVA again revealed a significant gender effect ($F=88.35$, $p<.0001$, $df=1,3479$) whereas the age effect was non-significant ($F=1.17$, $p=.3108$, $df=9,3479$). The interaction between gender and age was significant ($F=2.06$, $p=.0296$, $df=9,3479$), i.e., gender effect increases with age (see Table 6). If dream recall was introduced in the ANCOVA, the gender effect ($F=72.24$, $p<.0001$, $df=1,3432$) and interaction effect ($F=1.91$, $p=.0458$, $df=9,3432$) were still significant, whereas the age effect was

not ($F=0.58$, $p=.8166$, $df=9,3432$). The effect of the covariate dream recall frequency on dream sharing was marked ($F=899.97$, $p<.0001$, $df=1,3432$).

The mean of the dream listening frequency ($n=3515$) showed that on average children between 6 and 18 years listen to someone telling them about one of their dreams 1-4 times a month to 1-3 times per week (see Table 5). Girls (2.28 ± 1.22 , $n=2137$) listen more often to someone telling them about one of their dreams than boys (1.61 ± 1.38 , $n=1378$). The ANOVA indicated a significant gender effect ($F=93.21$, $p<.0001$, $df=1,3515$) and age effect ($F=5.96$, $p<.0001$, $df=9,3514$) whereas the interaction between gender and age ($F=1.87$, $p=.0804$, $df=9,3462$) was marginally significant, i.e., gender differences increase slightly with age (see Table 6). Including dream recall frequency (ANCOVA) showed that the gender effect ($F=7.22$, $p<.0001$, $df=1,3452$) and the age effect ($F=4.85$, $p<.0001$, $df=9,3462$) are still significant, whereas the interaction between gender and age ($F=1.71$, $p=.0804$, $df=9,3462$) was marginally significant. The effect of the covariate dream recall frequency was significant ($F=257.65$, $p<.0001$, $df=1,3462$).

The mean of the nightmare frequency ($n=3516$) showed that on average children between 6 and 18 years have 1-11 times per year to 1-4 times a month a nightmare (see Table 5). Girls (1.52 ± 1.15 , $n=2138$) reported more nightmares than boys (1.37 ± 1.26 , $n=1378$). The effect size for children ≤ 10 years is 0.047 and for children > 10 years 0.152. The ANOVA showed a significant gender effect ($F=6.47$, $p=.0110$, $df=1,3515$) and a significant age effect ($F=5.95$, $p<.0001$, $df=9,3515$). The interaction between gender and age ($F=0.56$, $p=.8325$, $df=9,3515$) was non-significant. Including dream recall frequency reduced the gender effect ($F=2.3$, $p=.1293$, $df=1,3465$) which is not significant anymore, whereas the age effect ($F=7.27$, $p<.0001$, $df=9,3465$) was still significant. The interaction between gender and age ($F=0.49$, $p=.8826$, $df=9,3465$) was non-significant and the effect of the covariate dream recall frequency ($F=277.42$, $p<.0001$, $df=1,3465$) significant.

The intercorrelations between the four dream variables were high: $r=.463$ ($p<.0001$) for dream recall frequency and dream sharing frequency is, $r=.282$ ($p<.0001$) for dream recall frequency and dream listening frequency, $r=.270$ ($p<.0001$) for dream recall frequency and nightmare frequency, $r=.502$ ($p<.0001$) for dream sharing frequency and dream listening frequency, $r=.243$ ($p<.0001$) between dream sharing frequency and nightmare frequency, and $r=.195$ ($p<.0001$) for dream listening frequency and nightmare frequency.

Table 4. Age and gender distribution of the sample

Age group	Total	Females	Males
6-7 yrs.	58	33	25
8 yrs.	99	56	43
9 yrs.	189	115	74
10 yrs.	281	154	127
11 yrs.	599	369	230
12 yrs.	1052	649	403
13 yrs.	672	406	266
14 yrs.	339	211	128
15 yrs.	141	89	52
16-18 yrs.	104	68	36

Table 5. Means and standard deviations of the four dream variables

Age group	Dream recall frequency	Dream sharing frequency	Dream listening frequency	Nightmare frequency
All	2.61 ± 1.25	1.79 ± 1.34	2.02 ± 1.33	1.46 ± 1.20
6-7 yrs.	2.17 ± 1.40	1.44 ± 1.28	1.21 ± 1.29	1.38 ± 1.28
8 yrs.	2.16 ± 1.47	1.60 ± 1.33	1.60 ± 1.29	1.57 ± 1.32
9 yrs.	2.68 ± 1.37	1.74 ± 1.42	1.86 ± 1.36	1.68 ± 1.31
10 yrs.	2.46 ± 1.38	1.57 ± 1.33	1.68 ± 1.34	1.72 ± 1.24
11 yrs.	2.63 ± 1.29	1.83 ± 1.34	1.99 ± 1.32	1.55 ± 1.21
12 yrs.	2.64 ± 1.22	1.81 ± 1.34	2.08 ± 1.32	1.48 ± 1.18
13 yrs.	2.64 ± 1.22	1.81 ± 1.35	2.12 ± 1.31	1.36 ± 1.19
14 yrs.	2.73 ± 1.15	1.88 ± 1.32	2.13 ± 1.29	1.22 ± 1.12
15 yrs.	2.58 ± 1.04	1.81 ± 1.31	2.09 ± 1.27	1.20 ± 1.07
16-18 yrs.	2.54 ± 1.10	1.94 ± 1.19	2.34 ± 1.20	1.32 ± 1.03

4. Discussion

Overall, gender differences in dream recall frequency, dream sharing frequency, dream listening frequency and nightmare frequency were found, i.e., girls for the ages from 6 to 18 recall more dreams, share more dreams, listen to more dreams and report more nightmares than boys. For dream sharing frequency and dream listening frequency gender differences increased significantly with age.

Before discussing the findings in detail, two methodological issues should be taken into consideration. First, the present sample is not representative. It is likely that a selection bias might have affected the results, i.e., high dream recallers might have more likely filled in the dream questionnaire. Secondly, for younger children (small number of 6 and 7-year old children) it might be necessary to conduct interviews because the questionnaire method may not produce reliable results. The present findings in this age group should be interpreted with caution. In addition, for the age range between 16 and 18 not much data were available, so larger samples are necessary to replicate the findings.

It was observed that girls recall significantly more dreams and report significantly more nightmares than boys – which is in line with the meta-analyses (Schredl & Reinhard, 2008, 2011). Moreover, the effect sizes for children > 10 years and children ≤ 10 years showed the similar pattern with the smaller effect sizes for the younger children. From a methodological viewpoint, it should be taken into consideration that the present study used a nightmare definition without an awakening criterion; however, gender differences were not affected by different nightmare definitions (Schredl & Reinhard, 2011). This particular definition was used to help the respondents to differentiate nightmare from night terrors which are normally not recalled (Schredl, 2009b).

The effect size of gender in dream sharing frequency of this study is in the range of effect sizes of earlier studies (see Table 3). Girls share significantly more dreams than boys. The gender effect increases significantly with age. Adolescents between 13 and 18 years show a clearly higher gender difference in dream sharing frequency than children between 6 and 12 years – which would support the hypothesis of gender-specific dream socialization (Schredl & Reinhard,

Table 6. Effect sizes for the gender differences for the total sample and all age groups

Age group	Dream recall frequency	Dream sharing frequency	Dream listening frequency	Nightmare frequency
All	0.182	0.572	0.514	0.124
6-7 yrs.	0.162	0.023	0.304	0.023
8 yrs.	0.136	0.502	0.312	0.137
9 yrs.	0.058	0.246	0.240	0.121
10 yrs.	0.087	0.264	0.299	-0.040
11 yrs.	0.153	0.415	0.413	0.165
12 yrs.	0.177	0.481	0.483	0.083
13 yrs.	0.244	0.638	0.676	0.235
14 yrs.	0.120	0.662	0.737	0.203
15 yrs.	0.122	0.908	0.709	0.167
16-18 yrs.	0.476	0.733	0.725	0.178

2008). The same effect of increasing gender differences was also found for the dream listening frequency. This interaction effect cannot be explained by gender-specific increase in dream recall frequency because this variable was statistically controlled. As dream listening frequency increased significantly with age in childhood and adulthood for both genders, one might hypothesize that this reflect an increasing interest for inner processes in this age range; a finding which is not explained by increase in dream recall frequency as the effect of this variable was controlled in the statistical analysis.

One possible explanation for the increasing gender difference with age in childhood and adulthood in dream sharing frequency and dream listening frequency might be the role of the peer group in dream socialization. Whereas younger children often interact with their family members on these topics (Bachner et al., 2012), one could assume that starting with the age of 13 social interactions with peers are clearly intensifying regarding discussion personal topics (Rubin, Copian, Chen, Bowker, & McDonald, 2011) and therefore – as in this age range same-sex friendships are more common, gender-specific dream socialization might probably have a higher impact. I. e., girls who sharing dreams more often than boys reinforce each other regarding their involvement with dreams and, thus, increase dream recall frequency (Reed, 1973). Based on the high correlation coefficient between dream sharing frequency and dream listening frequency, one could speculate that dream sharing frequency and dream listening frequency possibly reinforce each other because if you are listening to dreams of another person the more likely you share dreams with this person – a reflection of increasing trust in the relationship. Bachner et al. (2012) showed that the disclosure of dreams correlated significantly with the quality of the relationship however, it should be noted that this study elicited dream sharing frequency retrospectively. Research regarding dream listening on dream sharing in children and adolescents is still in its infancy, so more research in this area is needed.

To summarize, age had interacted with gender differences in dream variables. For studying how and when these gender differences emerge, carefully carried out longitudinal studies will be necessary. And to follow-up the children into young adulthood will provide evidence whether dream socialization has an effect on dream recall frequency and other dream parameters in adulthood. In order to test causal relationships, one might conduct study introducing experimental manipulations, e.g., instruct parents to ask their children regularly about dreams. As the participants in this study represent primarily the western world it would be very interesting to carry out studies with children and adolescents of other cultural backgrounds.

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